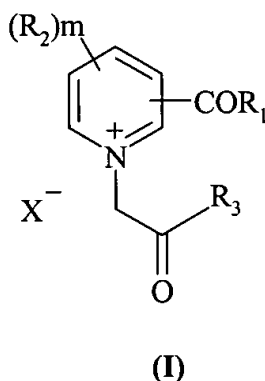


IN THE CLAIMS:

Please cancel claims 15, 30, 35, 40, 45, 64, 70 and 76 without prejudice or disclaimer.

Please enter the following amended claims:

1. (amended) A cosmetic composition comprising an effective amount of a compound with free radical scavenging, AGE breaking and AGE-formation inhibiting activity having the formula (I),



or its cosmetically acceptable salts contained in a cosmetically acceptable carrier

wherein

R_1 is $-N(R_7)N(R_7)R_9$;

where R_7 is selected from the group consisting of H, alkyl and aryl including heteroaryl, provided R_7 may be the same or different for R_1 and R_3 in the same compound;

R_2 is selected from the group consisting of F, Cl, Br, I, OR_7 , NO_2 , alkyl, aryl including heteroaryl, formyl, acyl, $C(O)NR_7R_{10}$, $C(O)OR_7$, NR_7R_{10} , $N=C(R_7)(R_{10})$, SR_7 , SO_2NH_2 , SO_2 alkyl and SO_2 aryl;

m is 0, 1 or 2;

R_3 is selected from the group consisting of R_7 , OR_7 , $N(R_7)(R_{10})$, $N=C(R_7)(R_{10})$, $N(R_7)N(R_7)(R_{10})$, $N(R_7)N=C(R_7)(R_{10})$ and $CH(R_7)C(O)R_8$

where R_8 is selected from the group consisting of R_7 , OR_7 and NR_7R_{10} ;

R_9 is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, $C(O)R_{10}$, $-SO_2R_{10}$, $C(S)NHR_{10}$, $C(NH)NH(R_{10})$ and $C(O)NHR_{10}$;

Allyl
Cont R_{10} is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each case may be the same or different from substituent R_7 , provided R_{10} may be the same or different for R_1 and R_3 in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion, oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion, phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF_4^- and PF_6^- ;

with proviso that,

- (i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked together to form a cyclic structure;
- (ii) the nitrogen of heteroaryl ring of R_{10} , when present, may be quaternized;
- (iii) when R_3 is OR_7 and R_1 is $-NHNH_2$ then R_7 is not alkyl
- (iv) when R_3 is OR_7 , R_1 is $N(R_7)N(R_7)R_9$ and R_9 is $C(O)R_{10}$ where R_{10} is alkyl, then R_7 is not hydrogen, and
- (v) at least one heteroaryl group is present.

4. (amended) The composition as claimed in claim 1, wherein for said compound m is 0 or

Allyl
1.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/995,731

5. (amended) The composition as claimed in claim 2, wherein for said compound m is 0 or

1.

6. (amended) The composition as claimed in claim 3, wherein for said compound m is 0 or

1.

7. (amended) The composition as claimed in claim 1, wherein for said compound m is 0.

8. (amended) The composition as claimed in claim 2, wherein for said compound m is 0.

9. (amended) The composition as claimed in claim 3, wherein for said compound m is 0.

10. (amended) The composition as claimed in claim 1, wherein for said compound X is a halide ion.

11. (amended) The composition as claimed in claim 1, wherein said compound is selected from the group consisting of:

(a) N,N'-bis[3-carbonyl-1-(2-thien-2'-yl)-2-oxoethyl]-3-pyridinium]hydrazine dibromide or other cosmetically acceptable salts thereof,

(b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl)pyridinium bromide or other cosmetically acceptable salts thereof,

(d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,


(f) 1-(2-thien-2'-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl)pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl)pyridinium]hydrazine dibromide or other cosmetically acceptable salts thereof.

12. (amended) The composition as claimed in claim 1, wherein said compound is selected from the group consisting of:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

 13. (amended) The composition as claimed in claim 1, wherein said compound is selected from the group consisting of:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other cosmetically acceptable salts thereof, and


(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other cosmetically acceptable salts thereof.

14. (amended) The composition as claimed in claim 1, wherein said compound is selected

from the group consisting of:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other cosmetically acceptable salts thereof,

 (ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other cosmetically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other cosmetically acceptable salts thereof,

A2 (bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,


(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

A3 17. (amended) A composition useful for the cosmetic application comprising an effective amount of said compound with free radical scavenger, AGE breaker and AGE formation inhibitor activity as defined in claim 1 or its cosmetically acceptable salts contained in a cosmetically acceptable carrier wherein said composition is effective for at least one of the following applications:

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/995,731

- 
- a) reversal and prevention of wrinkles,
 - b) reversal and prevention of fine lines,
 - c) promotion of epidermal growth,
 - d) photo protection of skin,
 - e) reversal and prevention of skin discoloration,
 - f) reversal and prevention of age spots,
 - g) conditioning and prevention of dry spot,
 - h) reversal and prevention of stretch marks,
 - i) reversal and prevention of blemishes,
 - j) skin care and conditioning,
 - g) reversal and prevention of senile xerosis,
 - l) conditioning and prevention of sun burns,
 - m) preventing and reversing the loss of collagen,
 - n) improving skin texture,
 - o) improving skin tone,
 - p) enhancing of skin thickness,
 - q) decreasing pore size,
 - r) restoring skin luster,
 - s) minimising signs of fatigue,
 - t) reducing acne,
 - u) treatment of Telangiectasia and

A3
Cont v) improving aesthetic appearance of hair and nails.

Q4 19. (amended) A method of cosmetic application with reversing and preventing effects on aging and wrinkling of the skin comprising applying an effective amount of a cosmetic composition comprising said compound with free radical scavenger, AGE-breaker and AGE formation-inhibitor activity having the formula (I) as defined in Claim 1 or its cosmetically acceptable salts contained in a cosmetically acceptable carrier.

23. (amended) A method of cosmetic application with reversing and preventing effects on at least one of the following :

- i) fine lines,
- ii) skin discoloration
- iii) age spots
- As* iv) stretch marks
- v) blemishes and
- vi) senile xerosis
- vii) preventing and reversing loss of collagen

comprising applying an effective amount of a cosmetic composition comprising said compound with free radical scavenger, AGE breaker and AGE formation inhibitor activity having the formula (I) as defined in claim 1 or its cosmetically acceptable salts contained in a cosmetically acceptable carrier.

24. (amended) A method of cosmetic application with conditioning and preventing effects in skin dryness and /or sun burns comprising applying an effective amount of a cosmetic

composition comprising said compound with free radical scavenger, AGE breaker and AGE formation inhibitor activity having the formula (I) as defined in claim 1 or cosmetically acceptable salts thereof contained in a cosmetically acceptable carrier.

25. (amended) A method of cosmetic application with effects of promoting epidermal growth and/or photo protection, improving skin texture, improving skin tone, enhancing skin thickness, decreasing pore size, restoring skin luster, minimizing signs of fatigue, reducing tone, treatment of telangiectasia comprising applying an effective amount of a cosmetic composition comprising said compound with free radical scavenger, AGE breaker and AGE formation inhibitor activity having the formula (I) as defined in claim 1 or its cosmetically acceptable salts contained in a cosmetically acceptable carrier.

26. (amended) The method as claimed in claim 19, wherein said compound is selected from the group consisting of the following compounds:

(a) N,N'-bis[3-carbonyl-1-(2-thien -2'- yl -2-oxoethyl) -3-pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(b) 1-(2-ethoxy -2-oxoethyl) -3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,

(f) 1-(2-thien -2'-yl -2-oxoethyl) -3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine

dibromide or other cosmetically acceptable salts thereof.

27. (amended) The method as claimed in claim 19, wherein said compound is selected from the group consisting of the following compounds:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

AS Cont (x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

28. (amended) The method as claimed in claim 19, wherein said compound is selected from the group consisting of the following compounds:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ag) 1-(2-thien-2'yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other cosmetically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other cosmetically acceptable salts thereof.

29. (amended) The method as claimed in claim 19, wherein said compound is selected from the group consisting of the following compounds:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

As Cont (ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other cosmetically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other cosmetically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium

chloride or other cosmetically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

25
Cont
(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other cosmetically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

31. (amended) The method as claimed in claim 23, wherein said compound is selected from the group consisting of the following compounds:

26
(a) N,N'-bis[3-carbonyl-1-(2-thien -2'- yl -2-oxoethyl) -3-pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

- (b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,
- (d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,
- (f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and
- (g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof.

32. (amended) The method as claimed in claim 23, wherein said compound is selected from the group consisting of the following compounds:

- (s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and
- (x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

33. (amended) The method as claimed in claim 23, wherein said compound is selected from the group consisting of the following compounds:

- (aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,
- (ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,
- (ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride

or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other cosmetically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other cosmetically acceptable salts thereof.

34. (amended) The method as claimed in claim 23, wherein said compound is selected from the group consisting of the following compounds:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other cosmetically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other cosmetically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

AL (aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other cosmetically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other

cosmetically acceptable salts thereof, and

AG
Co (bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium
bromide or other cosmetically acceptable salts thereof.

36. (amended) The method as claimed in claim 24, wherein said compound is selected from the group consisting of the following compounds:

(a) N,N'-bis[3-carbonyl-1-(2-thien -2'- yl -2-oxoethyl) -3-pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(b) 1-(2-ethoxy -2-oxoethyl) -3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

Q7 (d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,

(f) 1-(2-thien -2'-yl -2-oxoethyl) -3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof.

37. (amended) The method as claimed in claim 24, wherein said compound is selected from the group consisting of the following compounds:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

38. (amended) The method as claimed in claim 24, wherein said compound is selected from the group consisting of the following compounds:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

Q7 (ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ag) 1-(2-thien-2'yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other cosmetically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other cosmetically acceptable salts thereof.

39. (amended) The method as claimed in claim 24, wherein said compound is selected from the group consisting of the following compounds:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other cosmetically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/995,731

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

Q7 (as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other cosmetically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other cosmetically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

Q7 (bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

41. (amended) The method as claimed in claim 25, wherein said compound is selected from the group consisting of the following compounds:

As (a) N,N'-bis[3-carbonyl-1-(2-thien -2'- yl -2-oxoethyl) -3-pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(b) 1-(2-ethoxy -2-oxoethyl) -3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,

(f) 1-(2-thien -2'-yl -2-oxoethyl) -3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine

dibromide or other cosmetically acceptable salts thereof.

42. (amended) The method as claimed in claim 25, wherein said compound is selected from the group of the following compounds:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

43. (amended) The method as claimed in claim 25, wherein said compound is selected from the group consisting of the following compounds:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other cosmetically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other cosmetically acceptable salts thereof.

44. (amended) The method as claimed in claim 25, wherein said compound is selected from the group containing of the following compounds:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other cosmetically acceptable salts thereof,

As (ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other cosmetically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other cosmetically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium

chloride or other cosmetically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other cosmetically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other cosmetically acceptable salts thereof,

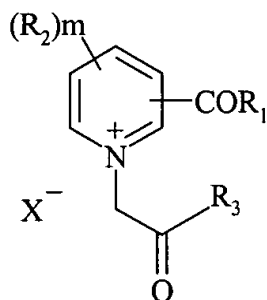
(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other cosmetically acceptable salts thereof.

49. (amended) A method of cosmetic application comprising applying an effective amount of said composition as claimed in claim 48.

50. (amended) A pharmaceutical composition for scavenging free radicals in the body cell of a mammal comprising a compound of formula (I) or pharmaceutically acceptable salts thereof



(I)

in admixture with pharmaceutically acceptable carrier, diluent, excipient or solvent,

wherein

R_1 is $-N(R_7)N(R_7)R_9$;

where R_7 is selected from the group consisting of H, alkyl and aryl including heteroaryl,

provided R_7 may be the same or different for R_1 and R_3 in the same compound;

R_2 is selected from the group consisting of F, Cl, Br, I, OR_7 , NO_2 , alkyl, aryl including heteroaryl, formyl, acyl, $C(O)NR_7R_{10}$, $C(O)OR_7$, NR_7R_{10} , $N=C(R_7)(R_{10})$, SR_7 , SO_2NH_2 , SO_2 alkyl and SO_2 aryl;

m is 0, 1 or 2;

R_3 is selected from the group consisting of R_7 , OR_7 , $N(R_7)(R_{10})$, $N=C(R_7)(R_{10})$, $N(R_7)N(R_7)(R_{10})$, $N(R_7)N=C(R_7)(R_{10})$ and $CH(R_7)C(O)R_8$

where R_8 is selected from the group consisting of R_7 , OR_7 and NR_7R_{10} ;

R_9 is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, $C(O)R_{10}$, $-SO_2R_{10}$, $C(S)NHR_{10}$, $C(NH)NH(R_{10})$ and $C(O)NHR_{10}$;

R₁₀ is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each case may be the same or different from substituent R₇, provided R₁₀ may be the same or different for R₁ and R₃ in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion, oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion, phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF₄⁻ and PF₆⁻;

with proviso that,

(i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked together to form a cyclic structure;

(ii) the nitrogen of heteroaryl ring of R₁₀, when present, may be quaternized;

(iii) when R₃ is OR₇ and R₁ is -NHNH₂ then R₇ is not alkyl;

(iv) when R₃ is OR₇, R₁ is N(R₇)N(R₇)R₉ and R₉ is C(O)R₁₀ where R₁₀ is alkyl, then R₇ is not hydrogen; and

(v) at least one heteroaryl group is present.

53. (amended) The composition as claimed in claim 50, wherein for said compound m is 0 or 1.

54. (amended) The composition as claimed in claim 51, wherein for said compound m is 0 or 1.

55. (amended) The composition as claimed in claim 52, wherein for said compound m is 0 or 1.

56. (amended) The composition as claimed in claim 50, wherein for said compound m is 0.


AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/995,731

57. (amended) The composition as claimed in claim 51, wherein for said compound m is 0.

58. (amended) The composition as claimed in claim 52, wherein for said compound m is 0.

59. (amended) The composition as claimed in claim 50, wherein for said compound X is a halide ion.

60. (amended) The composition as claimed in claim 50 wherein said compound is selected from the group consisting of

 (a) N,N'-bis[3-carbonyl-1-(2-thien-2'-yl-2-oxoethyl)-3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof.

61. (amended) The composition as claimed in claim 50 wherein said compound is selected from the group consisting of:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or

other pharmaceutically acceptable salts thereof.

62. (amended) The composition as claimed in claim 50 wherein said compound is selected from the group consisting of:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other pharmaceutically acceptable salts thereof.

63. (amended) The composition as claimed in claim 50 wherein said compound is selected from the group consisting of:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium

bromide or other pharmaceutically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

Q10 (as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide

or other pharmaceutically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other pharmaceutically acceptable salts thereof,

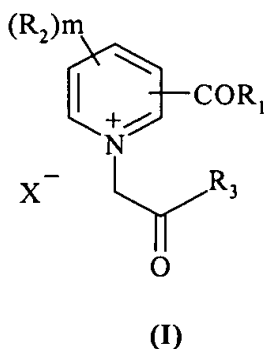
(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

65. (amended) A method of scavenging free radical in the body cells comprising administering to a mammal in need of scavenging free radical from its body cells an effective amount of a compound of formula (I) or pharmaceutically acceptable salts thereof and a



pharmaceutically acceptable carrier, diluent, excipient or solvent,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

wherein

R_1 is $-N(R_7) N(R_7) R_9$;

where R_7 is selected from the group consisting of H, alkyl and aryl including heteroaryl,
provided R_7 may be the same or different for R_1 and R_3 in the same compound;

R_2 is selected from the group consisting of F, Cl, Br, I, OR_7 , NO_2 , alkyl, aryl including
heteroaryl, formyl, acyl, $C(O)NR_7R_{10}$, $C(O)OR_7$, NR_7R_{10} , $N=C(R_7)(R_{10})$, SR_7 , SO_2NH_2 , SO_2
alkyl and SO_2 aryl;

m is 0, 1 or 2;

R_3 is selected from the group consisting of R_7 , OR_7 , $N(R_7)(R_{10})$, $N=C(R_7)(R_{10})$, $N(R_7)N(R_7)$
 (R_{10}) , $N(R_7)N=C(R_7)(R_{10})$ and $CH(R_7)C(O)R_8$

where R_8 is selected from the group consisting of R_7 , OR_7 and NR_7R_{10} ;

R_9 is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, $C(O)R_{10}$,
 $-SO_2R_{10}$, $C(S)NHR_{10}$, $C(NH)NH(R_{10})$ and $C(O)NHR_{10}$;

R_{10} is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each
case may be the same or different from substituent R_7 , provided R_{10} may be the same or different
for R_1 and R_3 in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion,
oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion,
phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF_4^- and PF_6^- ;

with proviso that,

(i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked

together to form a cyclic structure;

(ii) the nitrogen of heteroaryl ring of R_{10} , when present, may be quaternized;

(iii) when R_3 is OR_7 and R_1 is $-NHNH_2$ then R_7 is not alkyl;

(iv) when R_3 is OR_7 , R_1 is $N(R_7)N(R_7)R_9$ and R_9 is $C(O)R_{10}$ where R_{10} is alkyl, then R_7 is not hydrogen; and

(v) at least one heteroaryl group is present.

66. (amended) The method as claimed in claim 65, wherein said compound is selected from the group consisting of:

Q11 (a) N,N' -bis[3-carbonyl-1-(2-thien-2'-yl-2-oxoethyl)-3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(d) N,N' -bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and

(g) N,N' -bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof.

67. (amended) The method as claimed in claim 65, wherein said compound is selected from the group consisting of:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium

bromide or other pharmaceutically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

68. (amended) The method as claimed in claim 65, wherein said compound is selected from the group consisting of:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof, and

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other pharmaceutically acceptable salts thereof.

69. (amended) The method as claimed in claim 65 wherein said compound is selected from the group consisting of:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically

acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or

other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other pharmaceutically acceptable salts thereof,

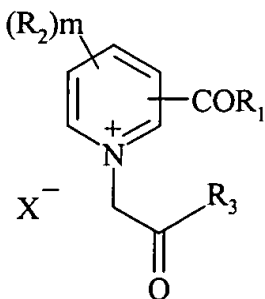
(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

71. (amended) A method of treating diseases caused by accumulation of free radicals in the body cells of a mammal comprising treating a mammal affected by such disease with an effective amount of a compound of formula (I)



(I)


or its pharmaceutically acceptable salts and a pharmaceutically acceptable carrier, diluent, excipient or solvent,

wherein

R_1 is $-N(R_7) N(R_7) R_9$;

where R_7 is selected from the group consisting of H, alkyl and aryl including heteroaryl, provided R_7 may be the same or different for R_1 and R_3 in the same compound;

R_2 is selected from the group consisting of F, Cl, Br, I, OR_7 , NO_2 , alkyl, aryl including heteroaryl, formyl, acyl, $C(O)NR_7R_{10}$, $C(O)OR_7$, NR_7R_{10} , $N=C(R_7)(R_{10})$, SR_7 , SO_2NH_2 , SO_2 alkyl and SO_2 aryl;

 m is 0, 1 or 2;

R_3 is selected from the group consisting of R_7 , OR_7 , $N(R_7)(R_{10})$, $N=C(R_7)(R_{10})$,

$N(R_7)N(R_7)(R_{10})$, $N(R_7)N=C(R_7)(R_{10})$ and $CH(R_7)C(O)R_8$

where R_8 is selected from the group consisting of R_7 , OR_7 and NR_7R_{10} ;

R_9 is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, $C(O)R_{10}$, $-SO_2R_{10}$, $C(S)NHR_{10}$, $C(NH)NH(R_{10})$ and $C(O)NHR_{10}$;

R_{10} is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each case may be the same or different from substituent R_7 , provided R_{10} may be the same or different for R_1 and R_3 in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion, oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion,

phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF_4^- and PF_6^- ;

with proviso that,

- (i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked together to form a cyclic structure;
- (ii) the nitrogen of heteroaryl ring of R_{10} , when present, may be quaternized;
- (iii) when R_3 is OR_7 and R_1 is $-\text{NHNH}_2$ then R_7 is not alkyl;
- (iv) when R_3 is OR_7 , R_1 is $\text{N}(\text{R}_7)\text{N}(\text{R}_7)\text{R}_9$ and R_9 is $\text{C}(\text{O})\text{R}_{10}$ where R_{10} is alkyl, then R_7 is not hydrogen; and
- (v) at least one heteroaryl group is present.

72. (amended) The method as claimed in claim 71 wherein said compound is selected from the group consisting of:

- (a) $\text{N,N}'$ -bis[3-carbonyl-1-(2-thien-2'-yl-2-oxoethyl)-3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,
- (b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,
- (d) $\text{N,N}'$ -bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutically acceptable salts thereof,
- (f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and
- (g) $\text{N,N}'$ -bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof.

73. (amended) The method as claimed in claim 71 wherein said compound is selected from the group consisting of:

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

74. (amended) The method as claimed in claim 71 wherein said compound is selected from the group consisting of:

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ah) 1-(2-cyclopropylamino-2-oxoethyl)-3-(2-methoxyethylaminocarbonyl)-pyridinium chloride or other pharmaceutically acceptable salts thereof, and


(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino

pyridinium chloride or other pharmaceutically acceptable salts thereof.

75. (amended) The method as claimed in claim 71 wherein said compound is selected from the group consisting of:

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other pharmaceutically acceptable salts thereof,

 (ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,


(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,


 (ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other pharmaceutically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

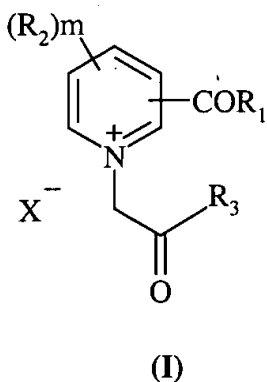
(bi) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

 77. (amended) The pharmaceutical composition as claimed in claim 50 in the form of an oral formulation, wherein the carrier, diluent, excipient or solvent is one acceptable for oral administration.

a₁₄ 79. (amended) The pharmaceutical composition as claimed in claim 50 in the form of a parenteral formulation, wherein the carrier, diluent, excipient or solvent is one acceptable for parenteral administration.

a₁₅ 81. (amended) The pharmaceutical composition as claimed in claim 50 in the form of a lotion, oral rinse or toothpaste, wherein the carrier, diluent, excipient or solvent is one acceptable for use in lotion, oral rinse or toothpaste.

83. (amended) A method of inhibiting the formation of AGE (Advanced Glycation End products) in a mammal which comprises administering an effective amount of a compound of Formula (I)



or its pharmaceutically acceptable salts in association with a pharmaceutically acceptable carrier, diluent, excipient or solvent,

wherein

R₁ is -N(R₇) N (R₇) R₉;

where R₇ is selected from the group consisting of H, alkyl and aryl including heteroaryl, provided R₇ may be the same or different for R₁ and R₃ in the same compound;

R₂ is selected from the group consisting of F, Cl, Br, I, OR₇, NO₂, alkyl, aryl including heteroaryl, formyl, acyl, C(O)NR₇R₁₀, C(O)OR₇, NR₇R₁₀, N=C(R₇)(R₁₀), SR₇, SO₂NH₂, SO₂ alkyl and SO₂aryl;

m is 0, 1 or 2;

R₃ is selected from the group consisting of R₇, OR₇, N(R₇)(R₁₀), N=C(R₇)(R₁₀),

N(R₇)N(R₇)(R₁₀), N(R₇)N=C(R₇)(R₁₀) and CH(R₇)C(O)R₈

where R₈ is selected from the group consisting of R₇, OR₇ and NR₇R₁₀;

R₉ is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, C(O)R₁₀, -SO₂R₁₀, C(S)NHR₁₀, C(NH)NH(R₁₀) and C(O)NHR₁₀;

R₁₀ is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each case may be the same or different from substituent R₇, provided R₁₀ may be the same or different for R₁ and R₃ in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion, oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion, phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF₄⁻ and PF₆⁻;

with proviso that,

(i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked together to form a cyclic structure;

(ii) the nitrogen of heteroaryl ring of R₁₀, when present, may be quaternized;

(iii) when R₃ is OR₇ and R₁ is -NHNH₂ then R₇ is not alkyl;

(iv) when R₃ is OR₇, R₁ is N(R₇)N(R₇)R₉ and R₉ is C(O)R₁₀ where R₁₀ is alkyl, then R₇ is not

hydrogen; and

(v) at least one heteroaryl group is present.

84. (amended) The method as claimed in claim 83, wherein said compound is selected from the group consisting of:

(a) N,N'-bis[3-carbonyl-1-(2-thien-2'-yl-2-oxoethyl)-3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

Q16 (d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or

other pharmaceutically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof,

(am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other pharmaceutically acceptable salts thereof,

Q16 (an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other pharmaceutically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,


(bh) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other

pharmaceutically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

85. (amended) A pharmaceutical composition for inhibiting the formation of AGE in a mammal comprising the compounds as defined in claim 83 in association with pharmaceutically acceptable carrier, diluent, excipient or solvent.

86. (amended) The composition as claimed in claim 85, wherein said compound is selected from the group comprising of:

 (a) N,N'-bis[3-carbonyl-1-(2-thien -2'- yl -2-oxoethyl) -3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(b) 1-(2-ethoxy -2-oxoethyl) -3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutially acceptable salts thereof,

(f) 1-(2-thien -2'-yl -2-oxoethyl) -3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof,

(g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,

(s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

other pharmaceutically acceptable salts thereof,


(aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,

(ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,

(af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ag) 1-(2-thien-2'yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof,

 (am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other pharmaceutically acceptable salts thereof,

(an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731


(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

 (aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium bromide or other pharmaceutically acceptable salts thereof,

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium

chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium]

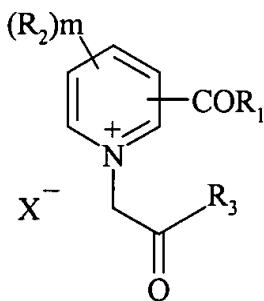
hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

(bi) 1-(2-thien-2(-yl-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.

87. (amended) A method of inhibiting diseases caused by onset of AGE (Advanced Glycation End products) in a mammal which comprises administering an effective amount of said compound as defined in claim 83 or its pharmaceutically acceptable salts in association with a pharmaceutically acceptable carrier, diluent, excipient or solvent.

89. (amended) A method of treating a mammal for conditions requiring simultaneous action of an AGE-breaker, AGE-formation inhibitor and a free radical scavenger which comprise administering an effective amount of a compound of formula (I)



(I)

or its pharmaceutically acceptable salts, in association with a pharmaceutically acceptable

carrier, diluent, excipient or solvent,

wherein

R_1 is $-N(R_7)N(R_7)R_9$;

where R_7 is selected from the group consisting of H, alkyl and aryl including heteroaryl,
provided R_7 may be the same or different for R_1 and R_3 in the same compound;

R_2 is selected from the group consisting of F, Cl, Br, I, OR_7 , NO_2 , alkyl, aryl including
heteroaryl, formyl, acyl, $C(O)NR_7R_{10}$, $C(O)OR_7$, NR_7R_{10} , $N=C(R_7)(R_{10})$, SR_7 , SO_2NH_2 , SO_2
alkyl and SO_2 aryl;

m is 0, 1 or 2;

R_3 is selected from the group consisting of R_7 , OR_7 , $N(R_7)(R_{10})$, $N=C(R_7)(R_{10})$, $N(R_7)N(R_7)$
 (R_{10}) , $N(R_7)N=C(R_7)(R_{10})$ and $CH(R_7)C(O)R_8$

where R_8 is selected from the group consisting of R_7 , OR_7 and NR_7R_{10} ;

R_9 is selected from the group consisting of hydrogen, alkyl, aryl including heteroaryl, $C(O)R_{10}$,
 $-SO_2R_{10}$, $C(S)NHR_{10}$, $C(NH)NH(R_{10})$ and $C(O)NHR_{10}$;

R_{10} is selected from the group consisting of H, alkyl and aryl, including heteroaryl and in each
case may be the same or different from substituent R_7 , provided R_{10} may be the same or different
for R_1 and R_3 in the same compound;

X is selected from the group consisting of a halide ion, acetate ion, perchlorate ion, sulfonate ion,
oxalate ion, citrate ion, tosylate ion, maleate ion, mesylate ion, carbonate ion, sulfite ion,
phosphoric hydrogen ion, phosphonate ion, phosphate ion, BF_4^- and PF_6^- ;

with proviso that,

- (i) when two alkyl groups are present on the same carbon or nitrogen, they may be linked together to form a cyclic structure;
- (ii) the nitrogen of heteroaryl ring of R_{10} , when present, may be quaternized;
- (iii) when R_3 is OR_7 and R_1 is $-NHNH_2$ then R_7 is not alkyl;
- (iv) when R_3 is OR_7 , R_1 is $N(R_7)N(R_7)R_9$ and R_9 is $C(O)R_{10}$ where R_{10} is alkyl, then R_7 is not hydrogen; and
- (v) at least one heteroaryl group is present.

90. (amended) The method as claimed in claim 89, wherein said compound is selected from the group consisting of:

- Q17
- (a) N,N'-bis[3-carbonyl-1-(2-thien-2'-yl-2-oxoethyl)-3-pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,
 - (b) 1-(2-ethoxy-2-oxoethyl)-3-(2-(2-pyridyl)hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,
 - (d) N,N'-bis[3-carbonyl-1-(2-phenyl-2-oxoethyl)pyridinium]hydrazine dibromide or other pharmaceutically acceptable salts thereof,
 - (f) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazinocarbonyl) pyridinium bromide or other cosmetically acceptable salts thereof, and
 - (g) N,N'-bis[3-carbonyl-1-(2-(2',4'-dichlorophenyl)-2-oxoethyl) pyridinium] hydrazine dibromide or other cosmetically acceptable salts thereof,
 - (s) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylaminocarbonyl hydrazinocarbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

- (x) 1-(2-thien-2'-yl-2-oxoethyl)-3-(phenylcarbonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof,
- (aa) N, N' - bis [3-carbonyl-1-(2-furan-2'-yl-2-oxoethyl) pyridinium] hydrazine dibromide or other pharmaceutically acceptable salts thereof,
- (ab) N,N'-bis [3-carbonyl -1- (2-thien-2'-yl-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,
- (ac) N,N'-bis-[3-carbonyl-1-(2-cyclopropylamino-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutially acceptable salts thereof,
- (af) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,
- Q.17 (ag) 1-(2-thien-2'-yl-2-oxoethyl)-3-(2-(2-chloro-3-pyridoylhydrazinocarbonyl) -pyridinium chloride or other pharmaceutically acceptable salts thereof,
- (am) 1-(2-thien-2'-yl-2-oxoethyl)-3-[1-oxo-1-(2-methoxy carbonyl) pyridyl] hydrazino pyridinium chloride or other pharmaceutically acceptable salts thereof,
- (an) 1-[1-(2-thien-2'-yl-2-oxoethyl)-5-aminocarbonyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,
- (ao) 1-(2-thien-2'-yl-2-oxoethyl)-3-(trifluoromethanesulfonyl hydrazino carbonyl) - pyridinium bromide or other pharmaceutically acceptable salts thereof,
- (ap) 1-[1-(2-thien-2'-yl-2-oxoethyl)-6-methyl-3-carbonyl pyridinium]-2-[1-(2-thien-2'-yl-2-oxoethyl)-3-carbonyl pyridinium] hydrazine dichloride or other pharmaceutically acceptable

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appl. No. 09/995,731

salts thereof,

(aq) N,N'-bis[3-carbonyl-1-(2-(5-methyl-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine
dichloride or other pharmaceutically acceptable salts thereof,

(ar) N,N'-bis[3-carbonyl-1-(2-(5-chloro-thien-2-yl)-2-oxoethyl) pyridinium] hydrazine
dichloride or other pharmaceutically acceptable salts thereof,

(as) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-6-methyl pyridinium
bromide or other pharmaceutically acceptable salts thereof,

(at) N,N'-bis[3-carbonyl-1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)pyridinium] hydrazine dichloride
or other pharmaceutically acceptable salts thereof,

0.7
(av) 1-(2-(4-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium
bromide or other pharmaceutically acceptable salts thereof,

(aw) 1-(2-(5-nitro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium
chloride or other pharmaceutically acceptable salts thereof,

(ax) 1-(2-(5-chloro-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium
bromide or other pharmaceutically acceptable salts thereof,

(ay) 1-(2-thien-2'-yl-2-oxoethyl)-3-(ethoxycarbonyl hydrazino carbonyl) pyridinium bromide or
other pharmaceutically acceptable salts thereof,

(az) 1-(2-thien-2'-yl-2-oxoethyl)-3-(isopropylsulfonyl hydrazino carbonyl) pyridinium bromide
or other pharmaceutically acceptable salts thereof,

(ba) 1-(2-thien-2'-yl-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl)-5-bromo pyridinium
bromide or other pharmaceutically acceptable salts thereof,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/995,731

(bc) 1-(2-(5-methyl-thien-2-yl)-2-oxoethyl)-3-(methanesulfonyl hydrazino carbonyl) pyridinium chloride or other pharmaceutically acceptable salts thereof,

(bf) N,N'-bis[3-carbonyl-1-(2-(2-ethoxycarbonyl pyrrolidin-1-yl)-2-oxoethyl) pyridinium] hydrazine dichloride or other pharmaceutically acceptable salts thereof,

(bh) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(phenyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof, and

Q.17 (bi) 1-(2-thien-2(-yl)-2-oxoethyl)-3-(p-methoxy phenyl sulfonyl hydrazino carbonyl) pyridinium bromide or other pharmaceutically acceptable salts thereof.
